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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,819	11/14/2003	Eisuke Wadahara	1402-03	2568

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IP GROUP OF DLA PIPER RUDNICK GRAY CARY US LLP
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EXAMINER	
PIZIALI, ANDREW T	

ART UNIT	PAPER NUMBER
1771	

DATE MAILED: 09/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/713,819	WADAHARA ET AL.	
	Examiner	Art Unit	
	Andrew T. Piziali	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-19 and 22-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-19 and 22-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/30/2006 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 15-17 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 4,320,160 to Nishimura et al. (hereinafter referred to as '160) in view of USPN 4,906,506 to Nishimura et al. (hereinafter referred to as '506) in view of USPN 5,649,398 to Isley, Jr. et al. (hereinafter referred to as Isley).

Regarding claims 15-17 and 22-24, '160 discloses a reinforcing carbon fiber substrate characterized in that said reinforcing fiber substrate includes a reinforcing fiber yarn group (B) arranged with reinforcing fiber yarns (2') in parallel to each other in one direction and a weft-direction auxiliary yarn group formed by auxiliary yarns (3) extending in a direction across said

reinforcing fiber yarns (see entire document including Figures 1-9, the paragraph bridging columns 1 and 2, column 3, lines 2-25, and column 6, lines 23-29). '160 discloses that the reinforcing carbon fiber yarns may have a yield of between 350 to 3,500 tex (column 6, lines 23-29).

'160 does not specifically mention a resin material provided at 2 to 17% by weight at least on a surface of said reinforcing fiber substrate, but '506 discloses that it is known in the reinforcing fiber substrate art to include resin material in 0.2 to 10 weight percent at least on a surface of a reinforcing fiber substrate to integrally bond the substrates (see entire document including column 4, lines 6-19). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include resin material in 0.2 to 10 weight percent at least on a surface of a reinforcing fiber substrate, as taught by '506, because the resin would advantageously integrally bond the substrates.

Regarding the resin being an interlamina-toughening resin, the current specification discloses that a resin is an interlamina-toughening resin when it is adhered to at least one surface of the substrate (see the paragraph bridging pages 49 and 50). Considering that '506 discloses that the resin adheres to at least one surface of the substrate (column 6, lines 22-39, and the Figures), the resin disclosed by '506 is an interlamina-toughening resin.

Regarding the resin being a powder resin, current claim 19 claims that the powder resin may be in studded formation. Therefore, claim 19 defines the term "powder resin" to include molten powder in dot-like formation (see page 73, lines 14-24 of the current specification). Considering that '506 discloses that the resin material may be studded on a surface of the

reinforcing fiber substrate (column 8, line 66 through column 10, line 34 and Figures 11-77), '506 can be considered a powder resin as defined by applicant.

Example 1 of '160 discloses that the auxiliary yarns may have 22.5 texture glass count, but '160 does not limit the yield of the auxiliary yarns. '160 is silent with regards to specific yield ranges, therefore, it would have been obvious to look to the prior art for conventional yields. Isley provides this conventional teaching showing that it is known in the fiber reinforced plastic art to use auxiliary yarns with a yield of 2 tex or less (tex = denier/9) with reinforcing yarns with a yield of between 350 to 3,500 tex (see entire document including the paragraph bridging columns 9 and 10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the auxiliary yarn with a yield of 2 tex or less, as taught by Isley, motivated by the expectation of successfully practicing the invention of '160 and because it is within the general skill of a worker in the art to select a known yield on the basis of its suitability and desired characteristics.

Regarding claims 16 and 17, '160 discloses that the substrate may have a warp-direction auxiliary yarn group formed by auxiliary yarns (3') extending in a direction parallel to said reinforcing fiber yarns (see Figures 1-9). Regarding claim 16, '160 does not specifically mention the yield of the auxiliary yarns, but '160 does disclose that an equal number of reinforcing yarns and auxiliary yarns may be used and that the reinforcing yarns may comprise 1,000 to 30,000 filaments while the auxiliary yarns may comprise 100 to 800 filaments of substantially the same diameter (see Figures 1-9, Table 1 and column 6, lines 30-46). Considering that '160 discloses that the reinforcing substrate may comprise as little as 0.33% auxiliary filaments, it appears that '160 teaches or at least suggests that the yield may be 20% or less of the yield of the reinforcing

yarns. It is also noted that '160 discloses that the quantity of reinforcing filaments may be varied based on the desired strength (column 3, lines 48-56). Therefore, in the event that it is shown that '160 does not specifically teach or suggest the claimed yield, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the yield, such as to 20% or less of the yield of the reinforcing yarns, because the yield directly affects the strength of the substrate and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Regarding claim 17, '160 discloses that the weft-direction auxiliary yarn group may be disposed on each surface of the substrate (see Figures 1-4).

Regarding claim 22, '160 does not specifically mention the claimed properties, but considering that the reinforcing fiber substrate taught by the applied prior art is substantially identical to the claimed reinforcing fiber substrate (unidirectional reinforcing fiber structure comprising warp and weft auxiliary yarns aligned in a specific orientation in a specific amount and also comprising resin in a specific shape and in a specific amount), it appears that if the composite reinforcing fiber volume fraction was 53 to 65% it would inherently possess the claimed properties.

Regarding claims 23 and 24, '160 does not specifically mention vacuum assisted injection molding or formation of a plurality of stacked and integrated preforms, but '160 does disclose that the substrate may be used for pressure molding (see Example 1) and considering that the reinforcing fiber substrate taught by the applied prior art is substantially identical to the claimed reinforcing fiber substrate (unidirectional reinforcing fiber structure comprising warp and weft auxiliary yarns aligned in a specific orientation in a specific amount and also

comprising resin in a specific shape and in a specific amount), it appears that the substrate is capable of performing the intended uses. It is noted that the recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

4. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 4,320,160 to Nishimura et al. in view of USPN 4,906,506 to Nishimura et al. in view of USPN 5,649,398 to Isley, Jr. et al. as applied to claims 15-17 and 22-24 above, and further in view of USPN 3,881,522 to Lewis et al. (hereinafter referred to as Lewis) and USPN 5,132,394 to Bockrath.

'160 discloses that gaps are present between the reinforcing fibers (see Figures 1-9), but '160 does not specifically mention the mean gap distance between adjacent fibers. '160 is silent with regards to specific gap distances, therefore, it would have been obvious to look to the prior art for conventional gap distances. Lewis provides this conventional teaching showing that it is known in the unidirectional fabric art to vary the gap distance based on the desired flexibility and pliability (see entire document including column 3, lines 12-21). Lewis specifically mentions a gap distance of about 1 mm but does not limit the gap to this distance (see column 6, lines 16-33 and Figure 8). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the distance between adjacent reinforcing fibers, such as from 0.1 to 1 mm, because the gap distance determines the flexibility and pliability of the fabric and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

'160 does not specifically mention a sizing agent, but Bockrath discloses that it is known in the reinforcing fiber fabric art to apply a sizing agent to fibers to facilitate the weaving process and to avoid or minimize loss of fiber properties (see entire document including column 10, lines 29-38). It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply a sizing agent to the auxiliary fibers, because the sizing agent would facilitate the weaving process and would avoid or minimize loss of fiber properties.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 4,320,160 to Nishimura et al. in view of USPN 4,906,506 to Nishimura et al. in view of USPN 5,649,398 to Isley, Jr. et al. as applied to claims 15-17 and 22-24 above, and further in view of USPN 5,071,711 to Heck et al. (hereinafter referred to as Heck).

'506 discloses that the resin material may be studded on a surface of the reinforcing fiber substrate (column 8, line 66 through column 10, line 34 and Figures 11-77). '506 does not specifically mention the diameter of the studded resin material, but considering that '506 discloses that the fibers may have a diameter of up to 0.86 mm (column 4, lines 26-41) and considering that the studded resin material is illustrated as having a diameter less than the diameter of the fibers (Figures 11-77), it appears that '506 teaches or at least suggests that the studded resin material may have a diameter of less than 1 mm.

'506 is silent with regards to the studded resin mean height, therefore, it would have been obvious to look to the prior art for conventional resin heights. Heck provides this conventional teaching showing that it is known in the reinforcing fiber substrate art to use a resin height of from about 5 to about 80 microns (see entire document including column 3, lines 14-22). Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to make the studded resin height from about 5 to about 80 microns motivated by the expectation of successfully practicing the teachings of '506.

6. Claims 15 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,649,398 to Isley, Jr. et al. in view of USPN 4,906,506 to Nishimura et al.

Regarding claims 15 and 22-24, Isley discloses a reinforcing carbon fiber substrate characterized in that said reinforcing fiber substrate includes a reinforcing fiber yarn group arranged with reinforcing fiber yarns in parallel to each other in one direction and a weft-direction auxiliary yarn group formed by auxiliary yarns extending in a direction across said reinforcing fiber yarns (see entire document including column 5, line 63 through column 6, line 19, column 9, line 38 through column 10, line 58, and Figures 8-15). Isley discloses that the auxiliary yarns may have a yield of 2 tex or less (tex = denier/9) with reinforcing yarns with a yield of between 350 to 3,500 tex (see the paragraph bridging columns 9 and 10).

Isley discloses that a surface of said reinforcing fiber substrate may be coated with a resin (column 6, lines 15-19 and column 10, lines 44-58), but Isley does not specifically mention a resin material provided at 2 to 17% by weight at least on a surface of said reinforcing fiber substrate. '506 discloses that it is known in the reinforcing fiber substrate art to include resin material in 0.2 to 10 weight percent at least on a surface of a reinforcing fiber substrate to integrally bond the substrates (see entire document including column 4, lines 6-19). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include resin material in 0.2 to 10 weight percent at least on a surface of a reinforcing fiber substrate, as taught by '506, because the resin would advantageously integrally bond the substrates.

Regarding the resin being an interlamina-toughening resin, the current specification discloses that a resin is an interlamina-toughening resin when it is adhered to at least one surface of the substrate (see the paragraph bridging pages 49 and 50). Considering that '506 discloses that the resin adheres to at least one surface of the substrate (column 6, lines 22-39, and the Figures), the resin disclosed by '506 is an interlamina-toughening resin.

Regarding the resin being a powder resin, current claim 19 claims that the powder resin may be in studded formation. Therefore, claim 19 defines the term "powder resin" to include molten powder in dot-like formation (see page 73, lines 14-24 of the current specification). Considering that '506 discloses that the resin material may be studded on a surface of the reinforcing fiber substrate (column 8, line 66 through column 10, line 34 and Figures 11-77), '506 can be considered a powder resin as defined by applicant.

Regarding claim 22, Isley does not specifically mention the claimed properties, but considering that the reinforcing fiber substrate taught by the applied prior art is substantially identical to the claimed reinforcing fiber substrate (unidirectional reinforcing fiber structure comprising weft auxiliary yarns aligned in a specific orientation in a specific amount and also comprising resin in a specific shape and in a specific amount), it appears that if the composite reinforcing fiber volume fraction was 53 to 65% it would inherently possess the claimed properties.

Regarding claim 23, Isley does not specifically mention vacuum assisted injection molding, but Isley does disclose that the substrate may be used for vacuum bagging (column 6, lines 20-24). Considering that the reinforcing fiber substrate taught by the applied prior art is substantially identical to the claimed reinforcing fiber substrate (unidirectional reinforcing fiber

structure comprising weft auxiliary yarns aligned in a specific orientation in a specific amount and also comprising resin in a specific shape and in a specific amount), it appears that the substrate is capable of performing the claimed intended use. It is noted that the recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Regarding claim 24, Isley discloses that the substrate may be used for formation of a perform in which a plurality of substrates are stacked and integrated (column 10, lines 35-42).

7. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,649,398 to Isley, Jr. et al. in view of USPN 4,906,506 to Nishimura et al. as applied to claims 15 and 22-24 above, and further in view of USPN 4,320,160 to Nishimura et al.

Isley does not appear to mention warp-direction auxiliary yarns, but '160 discloses that it is known in the reinforcing fiber substrate art to include warp-direction auxiliary yarns with weft-direction auxiliary yarns disposed on each surface of the substrate, to provide a substrate with additional strength (column 1, lines 49-57 and column 7, lines 6-18). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include warp-direction auxiliary yarns with weft-direction auxiliary yarns disposed on each surface of the substrate, as taught by '160, because the auxiliary yarns would improve the substrate strength.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,649,398 to Isley, Jr. et al. in view of USPN 4,906,506 to Nishimura et al. in view of USPN 4,320,160 to Nishimura et al. as applied to claims 16 and 17 above, and further in view of USPN 3,881,522 to Lewis et al. and USPN 5,132,394 to Bockrath.

Isley is silent with regards to specific gap distances, therefore, it would have been obvious to look to the prior art for conventional gap distances. Lewis provides this conventional teaching showing that it is known in the unidirectional fabric art to vary the gap distance based on the desired flexibility and pliability (see entire document including column 3, lines 12-21). Lewis specifically mentions a gap distance of about 1 mm but does not limit the gap to this distance (see column 6, lines 16-33 and Figure 8). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the distance between adjacent reinforcing fibers, such as from 0.1 to 1 mm, because the gap distance determines the flexibility and pliability of the fabric and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Isley does not specifically mention a sizing agent, but Bockrath discloses that it is known in the reinforcing fiber fabric art to apply a sizing agent to fibers to facilitate the weaving process and to avoid or minimize loss of fiber properties (see entire document including column 10, lines 29-38). It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply a sizing agent to the auxiliary fibers, because the sizing agent would facilitate the weaving process and would avoid or minimize loss of fiber properties.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,649,398 to Isley, Jr. et al. in view of USPN 4,906,506 to Nishimura et al. as applied to claims 15 and 22-24 above, and further in view of USPN 5,071,711 to Heck et al.

'506 discloses that the resin material may be studded on a surface of the reinforcing fiber substrate (column 8, line 66 through column 10, line 34 and Figures 11-77). '506 does not specifically mention the diameter of the studded resin material, but considering that '506 discloses that the fibers may have a diameter of up to 0.86 mm (column 4, lines 26-41) and considering that the studded resin material is illustrated as having a diameter less than the diameter of the fibers (Figures 11-77), it appears that '506 teaches or at least suggests that the studded resin material may have a diameter of less than 1 mm.

'506 is silent with regards to the studded resin mean height, therefore, it would have been obvious to look to the prior art for conventional resin heights. Heck provides this conventional teaching showing that it is known in the reinforcing fiber substrate art to use a resin height of from about 5 to about 80 microns (see entire document including column 3, lines 14-22). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the studded resin height from about 5 to about 80 microns motivated by the expectation of successfully practicing the teachings of '506.

Response to Arguments

10. Applicant's arguments have been considered but are mostly moot in view of the new grounds of rejection.

The applicant asserts that the applied prior art does not teach or suggest the claimed

interlamina-toughening resin because the prior art does not specifically mention impact resistance. The examiner respectfully disagrees. Regarding the resin being an interlamina-toughening resin, the current specification discloses that a resin is an interlamina-toughening resin when it is adhered to at least one surface of the substrate (see the paragraph bridging pages 49 and 50). Considering that '506 discloses that the resin adheres to at least one surface of the substrate (column 6, lines 22-39, and the Figures), the resin disclosed by '506 is an interlamina-toughening resin.

Conclusion

11. The following patent is cited to further show the state of the art with respect to the yield of carbon fiber bundles:

> USPN 4,891,267 to Takahashi et al. (Example 1 discloses that a carbon fiber bundle composed of 6,000 filaments each having a diameter of 7 μm has a yield of 3,600 denier (400 tex))

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T. Piziali whose telephone number is (571) 272-1541. The examiner can normally be reached on Monday-Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

atp

8/28/06

ANDREW T. PIZIALI
PATENT EXAMINER